

# Baryon Stopping in 158 GeV/N Pb+Pb Non-central Collisions

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The yield of net protons ( $p$  minus  $\bar{p}$ ) has been measured for non-central Pb+Pb collisions at 158 GeV per nucleon using the NA49 apparatus at the CERN SPS. When combined with a measurement of the net lambdas, this measurement shows the degree of stopping which the participating baryons undergo in these reactions[1]. The net lambda measurement has not yet been made for these non-central collisions. However, a direct comparison of the net protons alone from central and non-central collisions shows how the stopping depends upon the geometry of the collision.

Events were selected for this analysis based on the energy (veto energy) measured by a calorimeter downstream of the target and in the beam-line. The veto energy is primarily the energy carried by the non-interacting fraction of incident beam nucleus, and is therefore related to the centrality of the collision. The central events were selected as the five percent of all events with the lowest veto energy. The non-central events were selected with a window cut on the veto energy. The central and non-central events correspond to impact parameters of approximately less than 3 fm and 6 to 8 fm, respectively. The method used to measure the net proton spectra is the same as used for the central events[1].

Figure 1 (upper plot) compares the net proton rapidity distributions from central and non-central collisions. Neither spectrum has been corrected for net lambdas, so direct comparison is possible. The non-central collisions show significantly less stopping than the central collisions. This is qualitatively expected from extrapolation from simpler systems using, for instance, the Glauber model or more detailed transport models.

Figure 1 (lower plot) shows the inverse slopes of an exponential fit to the net proton transverse mass spectra for the two different centralities.

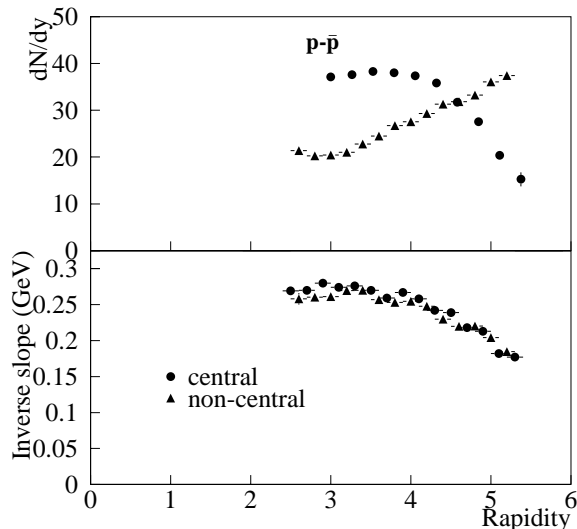


Figure 1: Preliminary spectra of net protons for central and non-central collisions. The top plot shows the yield and the bottom plot shows the results of exponential fits to the transverse mass distribution.

The non-central collisions exhibit only slightly softer spectra despite the significant difference in stopping. This saturation in the transverse motion of the produced particles was predicted in [2] on the basis of a hydrodynamical expansion model. In this model, central collisions result in an initially higher density than non-central collisions, but undergo a longer lasting longitudinal expansion, which limits the development of transverse motion.

## References

- [1] M. Toy et al., elsewhere in this report
- [2] J.-Y. Ollitrault, Phys. Lett. B **273**(1991), 31.